



PHGB 170 149
USA.

INVESTOR IN PEOPLE

The Patent Office
Concept House
Cardiff Road
Newport
South Wales
NP10 8QQ

11000 U.S. PTO
09/975380



I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

In accordance with the rules, the words "public limited company" may be replaced by p.l.c., l.l.c. or PLC.

Re-registration under the Companies Act does not constitute a new legal entity but merely subjects the company to certain additional company law rules.

Signed

Dated: 14 June 2001

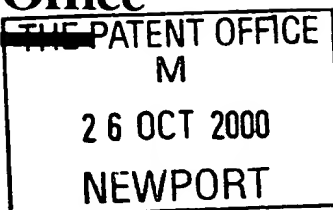
**CERTIFIED COPY OF
PRIORITY DOCUMENT**

An Executive Agency of the Department of Trade and Industry

THIS PAGE BLANK (USPTO)

Request for grant of a patent

(See notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)



The Patent Office
Cardiff Road
Newport
Gwent NP9 1RH

1. Your reference PHGB 000149
26OCT00 E578947-4 002879
F01/7700 0.00-0026208.9

2. Patent application number
(The Patent Office will fill in this part) **0026208.9**
26 OCT 2000

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Patents ADP Number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

KONINKLIJKE PHILIPS ELECTRONICS N.V.
GROENEWOUDSEWEG 1
5621 BA EINDHOVEN
THE NETHERLANDS

THE NETHERLANDS

7419294001

4. Title of the invention A DECODER SUPPORTING MULTIPLE INPUTS

5. Name of your agent (if you have one)
"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

Patents ADP number (if you know it)

ANDREW GORDON WHITE
Philips Corporate Intellectual Property
Cross Oak Lane
Redhill
Surrey
RH1 5HA

7133473002

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country	Priority Application number (if you know it)	Date of filing (day/month/year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application	Date of filing (day/month/year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer "Yes" if:
a) any applicant named in part 3 is not an inventor, or
b) there is an inventor who is not named as an applicant, or
c) any named applicant is a corporate body.
See note (d)) YES

9. Enter the number of sheets for any of the following items you are filing with this form.
Do not count copies of the same document.

Continuation sheets of this form

Description

6

Claims(s)

2

Abstract

1

Drawings

3

10. If you are also filing any of the following, state how many against each item:

Priority Documents

Translations of priority documents

Statement of inventorship and right

to grant of a patent (*Patents Form 7/77*)

Request for preliminary examination and

search (*Patents Form 9/77*)

Request for substantive examination

(*Patents Form 10/77*)

Any other documents

(*Please specify*)

11.

I/We request the grant of a patent on the basis of this application.

Signature

A. G. White

Date 25/10/2000

12. Name and daytime telephone number of person to contact in the United Kingdom

01293 815438

(A. G. WHITE)

Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

Notes

- If you need help to fill in this form or you have any questions, please contact the Patent Office on 0645 500505.*
- Write your answers in capital letters using black ink or you may type them.*
- If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.*
- If you have answered "Yes" Patents Form 7/77 will need to be filed.*
- Once you have filled in the form you must remember to sign and date it.*
- For details of the fee and ways to pay please contact the Patent Office.*

DESCRIPTION

A DECODER SUPPORTING MULTIPLE INPUTS

5 The present invention relates to a decoder suitable for use as a set-top-box or in an integrated digital television that supports multiple inputs.

Television programme broadcasts and interactive services transmitted over digital transmission systems such as Cable, Satellite or Radio Frequency based systems are normally multiplexed, encoded and encrypted in order to be transmitted. Upon receipt, the signal containing the broadcast or service must be routed through a decoder in order for the portion of the signal corresponding to a channel or service selected by a viewer to be demultiplexed, decoded and decrypted before being passed onto the television for display. One form of decoder is a set-top-box that is positioned between the signal receiver (aerial, cable node, satellite dish etc.) and the television. As an alternative to an external set-top-box, the decoder may be integrated into a television set. Both types of decoder perform the same sort of functions but have different physical positions in relation to the signal receiver and the television set.

The architecture of a typical decoder is schematically shown in Figure 1. A signal receiver (not shown) is normally connected via a cable to an input 5 of the decoder 10. The input 5 is connected to a tuner 20 which is in turn connected to a Common Interface (CI) slot 30. The CI slot 30 outputs to a demultiplexer 40 that is connected to a decoder 50. The decoder feeds a number of outputs 60, 70 to which audio-visual apparatus can be connected. A system processor 80 controls the operation of the decoder 10. Input means 90 may be connected to the system processor 80 to allow external control of the decoder 10.

30 Broadcasters use the opportunity offered by encrypted transmission to charge viewers for access to individual or groups of broadcasts and services. This is achieved by supplying on a smart card (not shown) only the decryption

keys for the broadcasts or services the viewer has purchased. The smart card is inserted into the CI slot 30 allowing the decoder to access the decryption keys and engine to decrypt the broadcasts or services selected. In order to ensure compatibility between different manufacture's decoders and smart cards of different broadcasters or service providers in Europe, the Common Interface standard (CI) was agreed. Throughout the remainder of this document the slots will be referred to as CI slots and smart cards as CI cards. However, other slot and card types and other key-based decryption systems including those of other standards could also be accommodated in the decoders described.

In operation, a received signal is fed to the input 5 of the decoder 10. The tuner 20 passes the signal to the CI slot 30. If a CI card (not shown) is inserted in the CI slot 30, the signal is routed through the card. The system processor 80 controls the card to process and decrypt a particular portion of the signal corresponding to a selected broadcast or service. The processed signal is then passed to the demultiplexer 40 which, under the control of the system processor 80, demultiplexes the signal to retrieve the decrypted portion of the signal. The portion of the signal is then passed to the decoder 50 which decodes the signal into video and audio components that are then passed to the relevant outputs 60, 70.

Decoders such as that described above with reference to Figure 1 offer perfectly acceptable performance and functionality when used for their intended purpose, receiving a signal from a single broadcaster or service provider and allowing access to the signal's components. However, the described architecture cannot cope with receiving two or more signals from different sources (eg. cable and satellite). Multiple CI cards cannot be supported in the above architecture without providing multiple CI slots. In addition, incoming signals are likely to have components using the same identifier or address. This may be the same broadcast received from two separate suppliers or it may be two or more different broadcasts. In either case, no form of conflict resolution is provided in the current architecture.

The only solution known at present is to have one decoder per signal source. Set-top-box type decoders output the selected broadcast or service onto the frequency or address that is associated with the set-top-box in the television so there is no conflict. This is an extremely expensive solution requiring a complete decoder for each signal source. In addition, this solution is not seamless in that channels must be changed both on the television and on the particular set top box. The solution also occupies considerable space in a viewer's home which is undesirable.

According to one aspect of the present invention, there is provided a decoder comprising a plurality of tuners for receiving data from different sources, each having an associated demultiplexer controlled to select a portion of a received signal corresponding to a selected channel or channels, the demultiplexers being arranged to output to a remultiplexer configured to determine selected signal portions that have overlapping addresses, to reallocate addresses of the signal portions so there is no overlap, and to multiplex the signal portions for supply to a common interface slot.

The present invention allows a number of sources to be decoded by a single decoder whilst sharing a large number of hardware components. In addition, different channels from different sources may be routed to a common CI card or to different CI cards. Selection to a CI card may be in dependence on a signal's content, source or other parameters.

The common interface slot may be arranged to route the multiplexed signal portions through any inserted common interface card and then on to a demultiplexer for dividing the multiplexed signal portions and routing at least a part of the divided output to its destination.

The decoder may have a switching unit connecting the demultiplexers to a number of remultiplexers, the switching unit being arranged to accept signal portions from the demultiplexers and to selectively switch each signal portion to one or more of the remultiplexers, each remultiplexer being configured to determine those signal portions that have overlapping addresses, to reallocate addresses of the signal portions so there is no

overlap, and to multiplex the signal portions for supply to a common interface slot.

Each remultiplexer may be connected to a different common interface slot.

5 A signal portion may be switched to a remultiplexer in dependence on its content.

A signal portion may be switched to a remultiplexer in dependence on its source.

An address may comprise a channel identifier.

10 Upon reallocating an address, a new index stream may be created and embedded within the signal portion.

Examples of the present invention will now be described in detail, by way of example only, and with reference to the accompanying drawings in which:

15 Figure 1 is a schematic diagram of the architecture of a typical decoder;

Figure 2 is a schematic diagram of the architecture of a decoder according to one example of the present invention; and,

Figure 3 is a schematic diagram of the architecture of a decoder according to another example of the present invention.

20

Figure 2 is a schematic diagram of the architecture of a decoder according to one example of the present invention.

The decoder 100 includes a number of tuners 110a-110d, a corresponding number of demultiplexers 120a-120d, a remultiplexer 130, a CI slot 140, a demultiplexer 150, a decoder 160 and a control processor 170.

25 Each tuner 110a-110d can be connected to a separate signal source. Each tuner passes its respective signal to its associated demultiplexer. The demultiplexer separates the signal into portions, each corresponding to a broadcast or provided service. The control processor 170 controls the demultiplexer to output one of the portions to the remultiplexer 130. Control
30 from the control processor 170 is normally on the basis of a channel or service selected by a viewer. However, control may be from predetermined

instructions hardcoded in the decoder 10. The remultiplexer 130 receives the selected signal portion from each demultiplexer 120a-120d. The signal portions are remapped if necessary in the remultiplexer 130 so that no two signal portions occupy the same address or have the same identity code. If
5 the identity code or address is changed, a new index stream may be created and embedded in the signal. The signal portions are then remultiplexed into a single signal and output to the CI slot 140. At the CI slot a CI card is inserted containing decryption keys.

Portions of the signal corresponding to broadcasts for which decryption
10 keys are held are decrypted under the control of the control processor 170 and the signal is then passed to the main demultiplexer 150. At the demultiplexer 150 the signal is broken into separate signal, each corresponding to each broadcast or service. In dependence on instructions issued by the control processor 170, the demultiplexer 150 routes one or more of the separate
15 signals to the decoder 160 to decode the signal into audio and visual components for output to a television. Alternatively or in addition, one or more of the signals maybe routed to a storage medium, a second television, a PC (all not shown) etc.

Figure 3 is a schematic diagram of the architecture of a decoder,
20 modified from that of Figure 2, according to another example of the present invention.

Each demultiplexer 120a-120d is connected to a switch 200. Under the control of the control processor 170 (Fig. 2) the switch 200 routes the separate signals from the demultiplexers 120a-120d to one of a number of
25 remultiplexers 210a-210c. Each remultiplexer 210a-210c is connected to a CI slot 220a-220c. The routing in the switch 200 is performed in dependence on network and channel identifiers within each signal and in dependence on the broadcasts and services CI cards in the CI slots 220a-220c can decrypt. The broadcasts and services a CI card can decrypt may be determined by
30 accessing the card itself or via some external data source. In this manner broadcasts or services are routed to the correct CI card. The outputs from the

CI slots 220a-c are then remultiplexed in a remultiplexer 230 and then passed to a demultiplexer 250 which operates to route the signal to its destination.

In this manner a single decoder can process multiple signal sources and output them to a number of destinations, possibly at the same time. All
5 broadcasts and services can be routed to, and decrypted by, a single CI card or through a number of CI cards. The requirement to have multiple decoders to cater for multiple sources or multiple destinations requiring different signals at the same time is therefore solved by a single, relatively simple, decoder.

CLAIMS

1. A decoder comprising a plurality of tuners for receiving data from different sources, each having an associated demultiplexer controlled to select
5 a portion of a received signal corresponding to a selected channel or channels, the demultiplexers being arranged to output to a remultiplexer configured to determine selected signal portions that have overlapping addresses, to reallocate addresses of the signal portions so there is no overlap, and to multiplex the signal portions for supply to a common interface slot.
10
2. A decoder according to claim 1, in which the common interface slot is arranged to route the multiplexed signal portions through any inserted common interface card and then on to a demultiplexer for dividing the multiplexed signal portions and routing at least a part of the divided output to
15 its destination.
3. A decoder according to claim 1 or 2, further comprising a switching unit connecting the demultiplexers to a number of remultiplexers, the switching unit being arranged to accept signal portions from the demultiplexers and to
20 selectively switch each signal portion to one or more of the remultiplexers, each remultiplexer being configured to determine those signal portions that have overlapping addresses, to reallocate addresses of the signal portions so there is no overlap, and to multiplex the signal portions for supply to a common interface slot.
25
4. A decoder according to claim 3, in which each remultiplexer is connected to a different common interface slot.
5. A decoder according to claim 3 or 4, in which a signal portion is
30 switched to a remultiplexer in dependence on its content.

6. A decoder according to claim 3 or 4, in which a signal portion is switched to a remultiplexer in dependence on its source.

7. A decoder according to any preceding claim, in which an address
5 comprises a channel identifier.

8. A decoder according to any preceding claim, in which upon reallocating an address, a new index stream is created and embedded within the signal portion.

10

9. A decoder substantially as hereinbefore described with reference to Figure 2 or Figure 3 of the accompanying drawings.

Abstract**A DECODER SUPPORTING MULTIPLE INPUTS**

- 5 A decoder has a plurality of tuners (110a-110d) for receiving data from different sources. Each tuner (110a-110d) has an associated demultiplexer (120a-120d) controlled to select a portion of a received signal corresponding to a selected channel or channels. The demultiplexers output to a remultiplexer (130; 210a-210c) configured to determine selected signal portions that have
- 10 overlapping addresses, to reallocate addresses of the signal portions so there is no overlap, and to multiplex the signal portions for supply to a common interface slot (140; 220a-220c).

[Fig. 2]

THIS PAGE BLANK (USPTO)

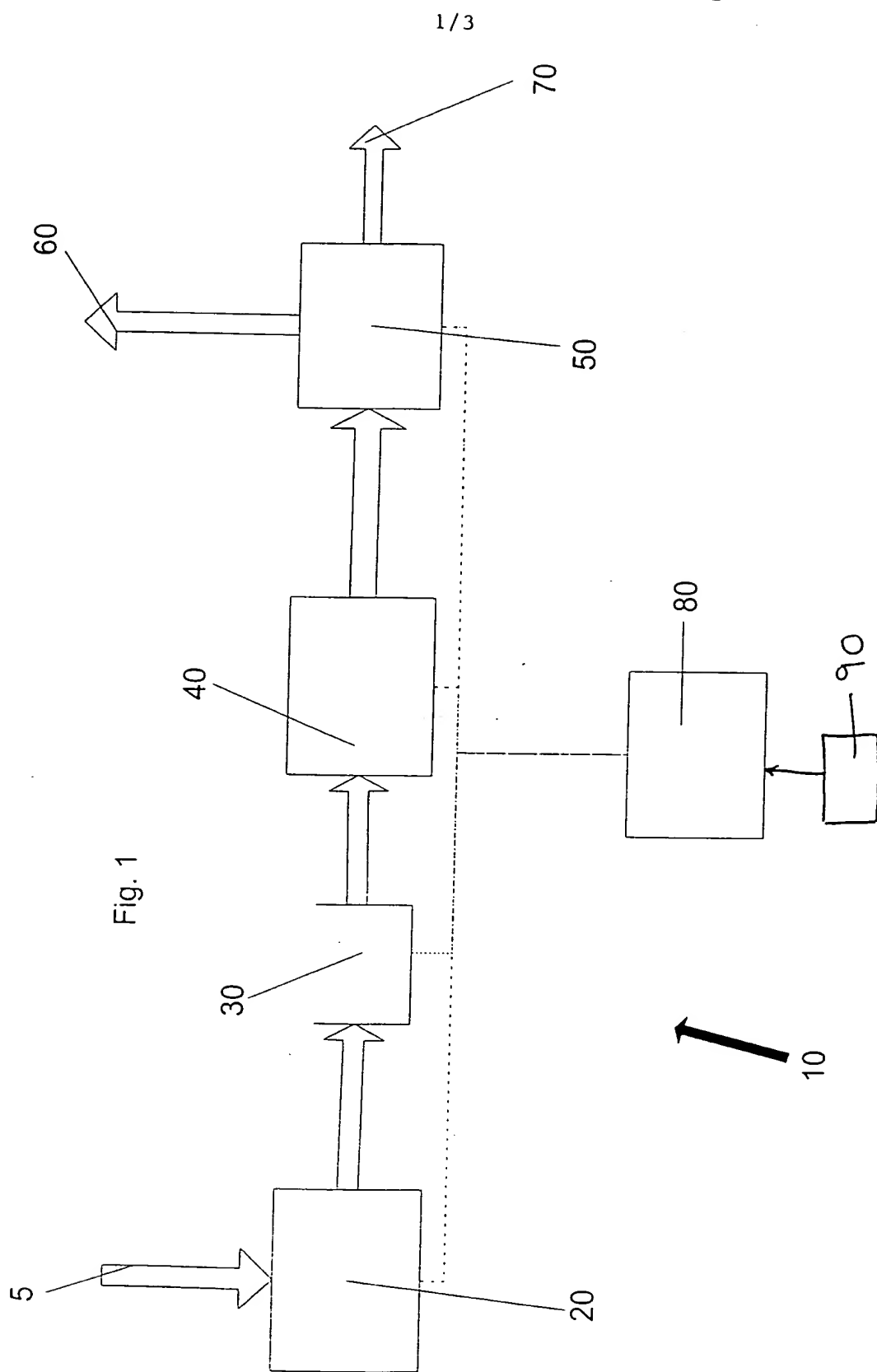


Fig. 1

THIS PAGE BLANK (USPTO)

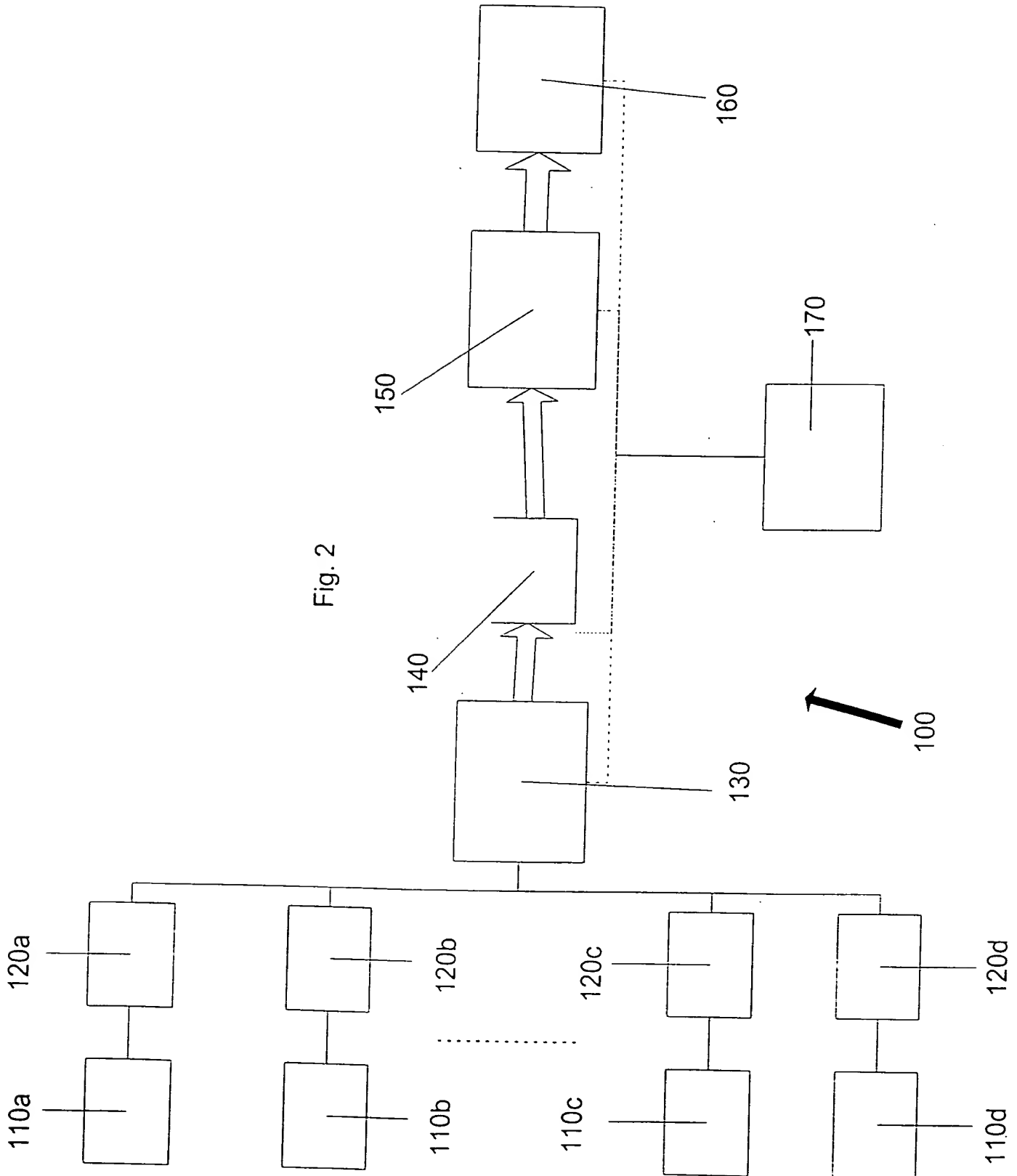


Fig. 2

THIS PAGE BLANK (USPTO)

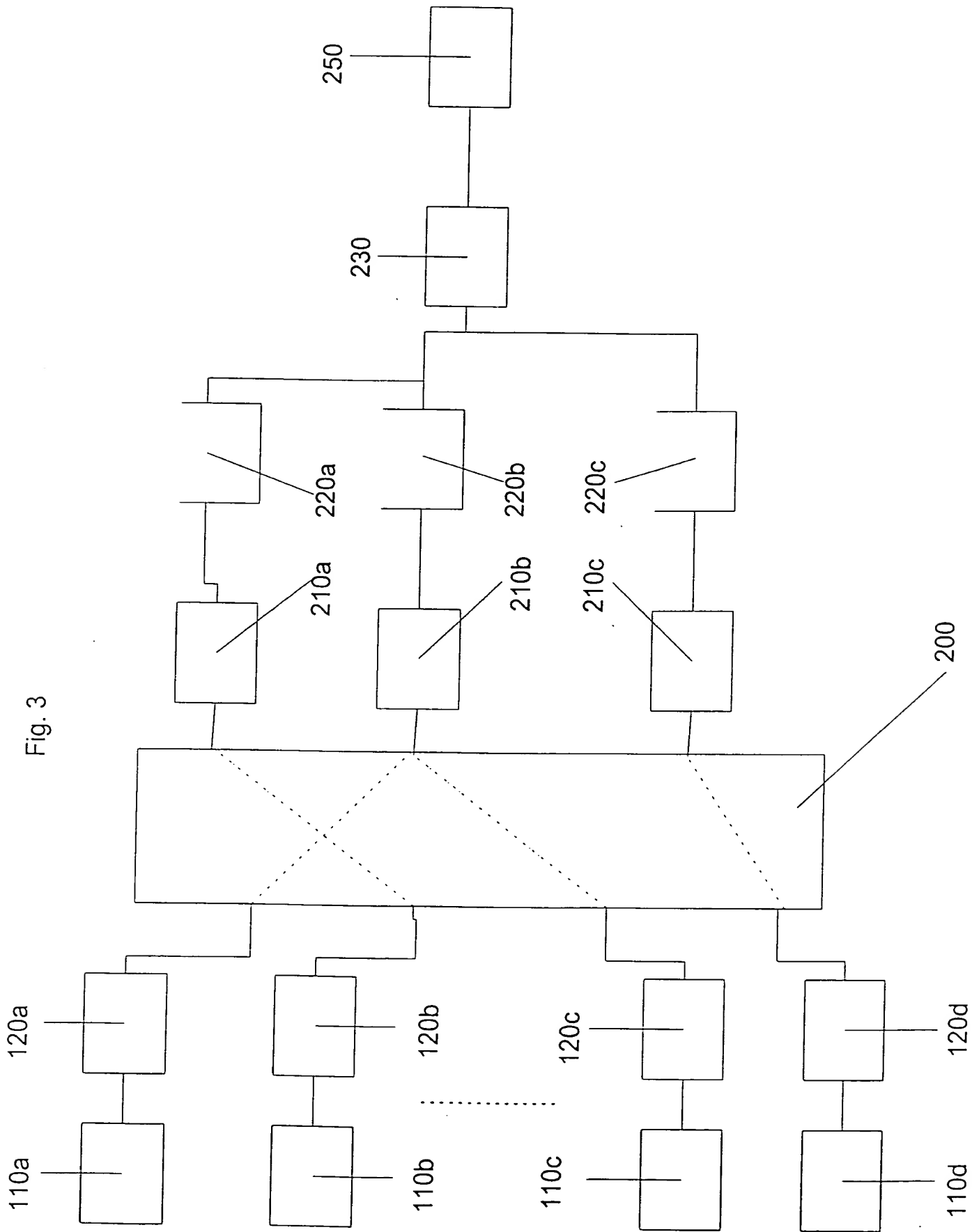


Fig. 3

THIS PAGE BLANK (USPTO,